Gyroxanthin-Radiolabeling as a Tool for Determining Growth Rates of Natural Populations of the Red Tide Dinoflagellate, *Karenia Brevis*

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Karenia brevis is a toxic dinoflagellate that blooms annually in the Gulf of Mexico resulting in extensive fish kills, neurotoxic shellfish poisoning, marine mammal mortalities, and human respiratory irritation from the release of aerosolized toxins. Determination of growth rates of harmful algal species is critical to describing (and predicting) their bloom dynamics, but there are currently few reliable methods of *directly* determining growth rates on natural populations. In our EPA-STAR funded research, we are examining a potential method for the characterization of growth rates of *Karenia brevis* in nature. This technique, known as photopigment radiolabeling, measures the incorporation of photosynthetically assimilated ^{14}C into photopigment molecules. *Karenia brevis* is an ideal candidate for this approach because it contains a unique photopigment known as gyroxanthin-diester that allows us to distinguish this dinoflagellate from other phytoplankton in the community. Results of laboratory-based batch culture experiments with *Karenia brevis* grown under a variety of light and nutrient regimes show that there is good agreement between growth rates based on time course measurements of chlorophyll *a* and cell numbers as compared to those determined by photopigment radiolabeling methods. In light of the possible relationships between anthropogenic nutrient discharges, coastal eutrophication, and harmful algal bloom (HAB) formation, this project has the potential to enhance our understanding of the mechanistic relationships between nutrients, light, and growth of *Karenia brevis*. Thus, our research addresses informational needs and concerns of phytoplankton physiologists and ecologists as well as resource managers concerned about controls on HABs in estuarine and coastal waters.